

Compete 2.0

Thrive.

The Skills Imperative



Compete.

Council on
Competitiveness

The Skills Imperative

COMPETE 2.0 TEAM

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Letter from the President

On behalf of the Council on Competitiveness, I am pleased to release the first report in our Compete 2.0 series, *Thrive: The Skills Imperative*. This report provides a compelling, short and easily accessible analysis of the key trends underpinning future skills challenges and opportunities in the United States.

Drawing upon the Council's leadership in innovative capacity, *Thrive* is the first in a series of targeted benchmarking reports published by the Council's Compete 2.0 Initiative. These reports will illuminate key areas of competitive advantage for Americans to succeed in the 21st century and provide an important framework for charting a path to prosperity for American citizens.

Grounded in the Council's overall policy agenda, the Compete 2.0 Initiative was launched in January 2008 to dive deeper into some of the key issues at the cutting-edge of global competitiveness that the Council highlighted in its 2006 *Competitiveness Index: Where America Stands*: skills; manufacturing; financial markets; infrastructure; and healthcare. With the Compete 2.0 Initiative, the Council will set a concrete action agenda to ensure that the United States can compete in the 21st century. To achieve this, the Council will publish benchmarking reports for each of these areas over the next two years and convene a series of outreach events centered on each report, targeting a diverse audience. Compete 2.0 will culminate with the publication of the Council's 2009 *Competitiveness Index*.

For this initiative, the Council convened a diverse and distinguished group of thought leaders from industry, academia and labor. We are very grateful to these advisors for so generously giving us their time and wisdom, providing guidance and feedback on this report, and serving as spokespeople for the initiative's outreach efforts. I would also like to acknowledge the Council's Compete 2.0 team for their outstanding work: Debra van Opstal, senior vice president for programs and policy; Chad Evans, vice president for strategic initiatives; Bill Bates, vice president for government affairs; and James Knuckles, research associate.

The United States is approaching a tipping point as the competition becomes ever more innovative, and the Council's Compete 2.0 Initiative will address how the United States can harness its intellectual, financial, entrepreneurial and human capital to ensure prosperity for all Americans in the 21st century. As we move forward, we welcome your participation and support.

Sincerely,



Deborah L. Wince-Smith
President

Key Take-Aways

The United States Needs a National Skills Agenda

During a time of turbulence and transition—driven by globalization, accelerating technological change, and volatility in global energy, currency and financial markets—**America needs a national skills agenda to compete globally and to ensure a rising standard of living for its citizens.**

National and Global Demographic Trends Are Raising Red Flags

Slowing growth of the U.S. workforce has the potential to slow economic output if productivity does not increase. Lack of adequate reading and math skills among new U.S. workers compounds this challenge. At the same time, hundreds of millions of educated foreign workers are entering the global workforce and competing for jobs that are increasingly vulnerable to offshoring.

Four Critical Skills Strategies for the United States

Meet the Demand for Middle Skills

Middle-skilled jobs represent the largest number of total openings in the United States until 2016, and the United States is failing to adequately train Americans to take advantage of this opportunity. These jobs do not always require a college degree, but most require training, technical sophistication and initiative. They pay well and do not offshore easily.

Build Service Economy Skills

More than three-quarters of all jobs in the United States are in the service economy, yet many policymakers view them as low-skill, low-wage options. In fact, the service sector is driving demand for more complex and creative skill sets—including problem solving, communications, entrepreneurship, computational analysis, collaboration and teamwork.

COMPETE 2.0: SKILLS ADVISORY COMMITTEE

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Compete for Innovation Advantage

Simply saying America needs more scientists and engineers is no guarantee that the United States can compete successfully in a global economy in which many nations have copied our model. Policy-makers must recognize that the margin of advantage will flow from the fusion of cutting-edge capabilities with entrepreneurial, creative and interdisciplinary talent. Four potential areas to start with to create competitive advantage:

- More integrative scientists and engineers
- More entrepreneurial scientists and engineers
- More business-savvy service scientists and engineers
- More computational scientists and engineers to leverage America's IT advantage

Create Skills for Sustainability

Sustainability will become a more important determinant of global hiring and investment patterns. Where new and growing companies locate and where jobs are created will depend in large measure on which countries successfully anticipate these opportunities and take steps to educate and train workers in these fields. America must get out front and move fast to develop the talent and skills workforce to capture these opportunities.

Competing in the Global Economy

Globalization is a game-changer. The competition has evolved and the playing field is more competitive. Global enterprises and networks that transcend national boundaries, hundreds of millions of middle-class consumers that reside outside the United States, and millions of new, sometimes highly credentialed workers whose average salaries are typically lower than the average American salary, all increasingly shape and mold the world's competitive landscape.

The United States' human capital, entrepreneurial culture and can-do spirit are some of the nation's strongest assets. But America will need new and proactive skills for success to ensure that we optimize those assets.

These Choices Are Ours to Make.

The Future Is Ours to Lose.

Creating the Context

As in the past, America today faces a period of economic transition and turbulence. Globalization and trade deficits, unprecedented competition in the world economy, an accelerating pace of technology change, and volatility in energy and financial markets pose great economic challenges as well as opportunities. There is no question that America needs to respond.

America's strength lies in a spirit that says: "The difficult we do immediately; the impossible might take a little longer."¹ America should concentrate its ingenuity, innovation and pragmatism on creating the strategies that will enable the country to compete successfully in the 21st century.

Some of the most critical strategies must focus around talent and skills—to ensure that America's workers have the tools to compete against anyone, anytime, anywhere in the world. In the emerging global economy of the 21st century, human capital is becoming the dominant competitive differentiator—for countries, companies and citizens.

Thrive: The Skills Imperative lays out a roadmap of the skills priorities for Americans to prosper in the jobs of the future.

Wanted: A National Skills Strategy

There are major demographic, educational and technological changes underway that could impede America's economic growth in the decades ahead: slowing growth in the U.S. workforce and flattening growth rates in educational attainment; growing competition from skilled workers around the world; and the ability to locate operations around the world wherever the right skills, infrastructure and incentives exist. A national skills strategy could mitigate many of these trends. Such a strategy has become an imperative to ensure that Americans have the skills to respond to current demands and to ensure that global companies invest in the United States. The trajectories and potential impact of each of these trends are briefly described in this report.

Economic Impact of a Slower Growth Workforce

For more than five decades, a growing labor force was one of the key drivers of the expanding U.S. economy. Driven by the baby boom generation and the entry of women into the workforce, the sheer growth of new entrants grew the economic pie by about 1.7 percent each year between 1948 and 2001.²

Falling Off the Flat Earth?

Norman R. Augustine

Retired Chairman & CEO

Lockheed Martin Corporation



Global leadership has come to be accepted by many Americans as our country's birthright. However, we would be wise to keep in mind that in the 16th century, it was Spain that was the dominant nation; in the 17th century, it was France; in the 19th century, it was England; and in the 20th century, it was America. The book hasn't been written on the 21st century yet, but it is clear that no nation has an entitlement to the future.

The United States is entering a global era in which Americans will have to compete for jobs in a global marketplace—not only with their neighbors down the street, but with highly motivated, highly capable, increasingly well-educated individuals from around the world. The change stems from what some have called “The Death of Distance.” In the last century, breakthroughs in aviation created the opportunity to

move people and goods rapidly and efficiently over very great distances. In the early part of the present century, we are approaching the point where the communication, storage and processing of information are nearly free. That is, we can now move not only physical items efficiently over great distances, we can also transport information in large volumes and at little cost.

In short, there is no longer a there, there—*there* is now *here*.

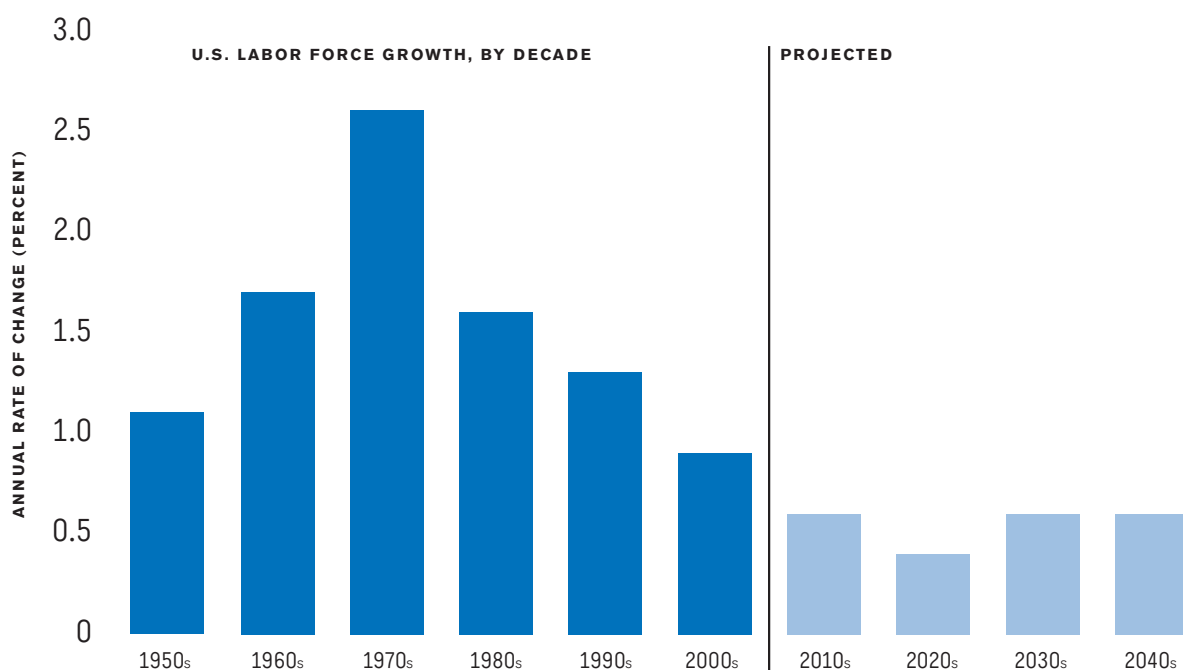
What does it mean for the average American that jobs throughout the food chain of employment will be just a mouse-click from candidates around the world? What does it mean—to cite one of many examples—that if you have a CT scan in a U.S. hospital it is likely to be read by a radiologist in either Bangalore or in Australia? As the Red Queen told Alice in *Through the Looking Glass*: “It takes all the running you can do to stay in the same place. If you want to go somewhere else, you must run twice as fast as that.” And indeed that's where we find ourselves.

Today, it is possible that our nation's adult generation will, for the first time in history, leave their children and grandchildren a lower sustained standard of living than they themselves enjoyed. Should that occur, it will be the consequence of a collective failure to respond to the increasingly clear signals that are emerging and indicate that we have entered a new era, a global era, an era in which Americans must compete in the marketplace not merely with each other but with highly qualified people around the planet. It will represent a change of seismic proportions with commensurate implications for America's economic well-being, national and homeland security, health care and overall standard of living.

Is American Falling Off the Flat Earth? National Academy Press, 2007

1. Slowing Workforce Growth Could Impede Economic Growth

Source: United States Bureau of Labor Statistics, *Monthly Labor Review*, 2007



However, the contribution of a growing labor force to economic growth will fall during the next decade. Growth in the labor force is slowing down as baby boomers retire and participation rates (especially by women) level off. According to the U.S. Bureau of Labor Statistics, labor force growth will slow to below 0.5 percent by 2020 before increasing again to only around 0.5 percent by 2040.³

If the U.S. economy must rely on fewer workers to sustain growth and support baby boom retirees, then those workers must become more productive if they are to preserve their living standard and that of their fellow citizens. Absent accelerating improvements in productivity, a slower growing workforce could put a drag on future GDP growth.

Flattening Growth of Educated Workers

The economic impacts of slower growth in the labor pool can be offset by improvements in technology infrastructure that enhance productivity, by higher quality skills or skills better matched to demand, or

by game-changing innovations that open up new high-value markets.⁴ Higher education and skills tend to make workers more productive.⁵

For most of the 20th century, education drove steady increases in workforce quality; in every successive generation, the workers entering the labor force were more educated than those they replaced. That influx of better educated workers allowed employers to exploit new technologies and create flexible, adaptable workplaces that could respond better to a more dynamic business environment.⁶

But the growth rate in the number of educated workers entering the workforce is beginning to flatten. Between 1980 and 2000, the increase in the number of workers with more than a high school education was 19 percent. For the next 20 years, the growth in educated workers is expected to slow to just 4 percent. Indicators point to a mismatch between the demand for higher skills and the supply of skilled workers.⁷

The Global Skills Competition

Perhaps the most profound change is the growth in educated and skilled workforces around the globe. Today, American workers at every skill level—from low-wage, low-skilled to high-wage, high-skilled—face growing competition from workers around the world.

The global labor supply effectively quadrupled between 1980 and 2005. For example, China's labor force—those working or looking for work—reached nearly 800 million in 2005, more than five times the size of the U.S. labor force. China's manufacturing employment alone exceeds the manufacturing employment of the entire G7 by 30 million workers. The entry of lower-wage workers from Eastern Europe and the former Soviet republics is also changing the dynamics of the global labor pool.⁸

2. A Growing Global Talent Pool Competes for Jobs

Source: Council on Competitiveness, *Competitiveness Index: Where America Stands*

Large professional workforce in emerging markets

YOUNG PROFESSIONALS, 2003, THOUSANDS				
	Engineers	Finance/ Accounting	Life Sciences Researchers	Analysts
China	1,589	945	543	202
United States	667	1615	852	175
India	528	2273	674	537
Russia	486	1082	108	107
Japan	317	702	180	55
Philippines	290	423	14	16
Brazil	158	355	75	16
U.K.	150	165	100	27
Germany	128	137	31	26
Mexico	115	319	23	8
Poland	82	231	25	22
Canada	81	150	89	18
Malaysia	49	83	19	11
Hungary	27	59	2	1
Ireland	22	32	4	3
Czech Republic	15	33	2	5

Emerging Markets

Developed Economies

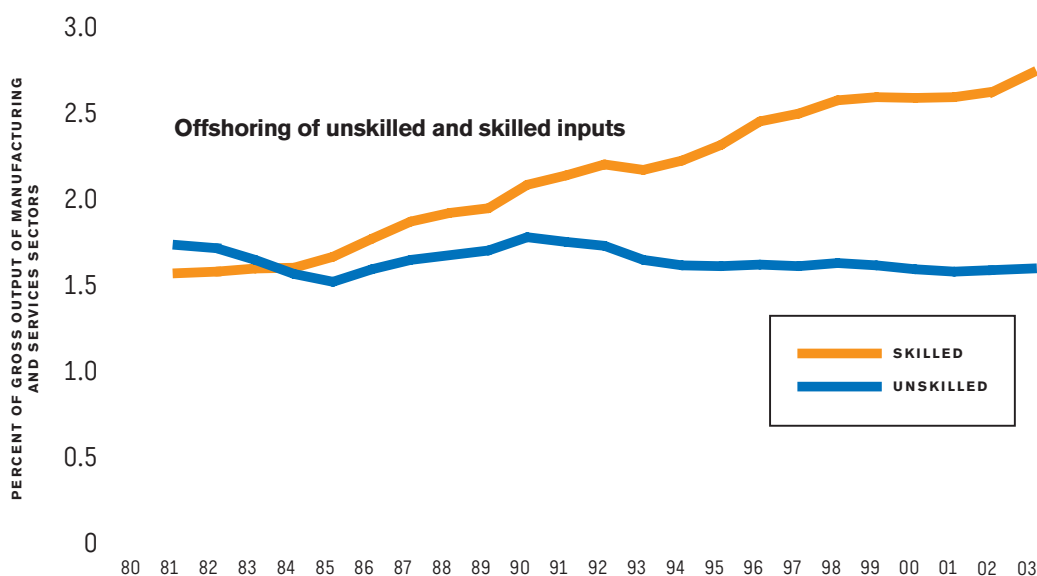
The Offshorability Factor

In lock step with the rise in global workforce skills are technological advances, particularly in telecommunications, software and information distribution, that make it easy to do business anywhere in the world. If a product, service or process is routine or can be broken down into a series of rules; if it can be digitized or reliably codified, it becomes a commodity. And its production is easier every day to ship digitally and rapidly to workers and consumers in other locations around the globe.

Princeton economist Alan Blinder notes that the offshorability factor should play a role in determining what kinds of skills to cultivate for national competitive advantage.

3. Jobs Requiring High Skills Are Becoming More Vulnerable to Offshoring

Source: IMF *World Economic Outlook*, April 2007



Note: Data are for the G7, the Netherlands and Australia

Although commodity production lines have been going to low-wage countries for decades, the ability to off-shore highly skilled jobs—radiology, engineering, accounting, computer programming—is a relatively newer trend. Increasingly, the critical distinction may no longer be between high-skilled and low-skilled jobs. Both are now offshorable.

Blinder postulates that, in the future, the dividing line might fall between occupations that can be performed at a distance with little or no diminution in quality and those that cannot. By that definition, as many as 30-40 million U.S.-based jobs might be vulnerable to offshoring.⁹

Bottom Line

As Compete 2.0 advisor Joseph Bordogna notes:

Civilization is on the brink of a new economic world order. The big winners in this increasingly fierce global reach for leadership will not be those who simply make commodities faster or cheaper than the competition, ultimately leading to a downward spiraling competition for low wages and lower margins. Rather, the winners will be those who develop talent, techniques and tools so advanced, that reaching a dimension of innovation beyond competition is ensured.¹⁰

Increasingly, America needs to think in terms of fostering training, educational programs and management systems that empower technology workers, build from its uniquely entrepreneurial culture, reinforce leadership in service industries with scientific discipline and data, and create unquestioned superiority in cutting-edge fields like nanotechnology, biotechnology, cognitive science, and information science and engineering. It means creating a workforce that is able and empowered to act on insight and experience, and an innovation system that is continually poised to deploy great ideas.

Skills Strategies for the Future

America must be more strategic about charting the path of future opportunities for workers, prioritizing around skills that do not offshore easily and are hard-to-replicate, that enable a faster pace of innovation, and that are emerging with new technologies and industries. Key areas of opportunity for the future prosperity of America's workers include:

- **Untapped Opportunities**
- **Service Economy Skills**
- **The Innovation Advantage**
- **Skills for Sustainability**

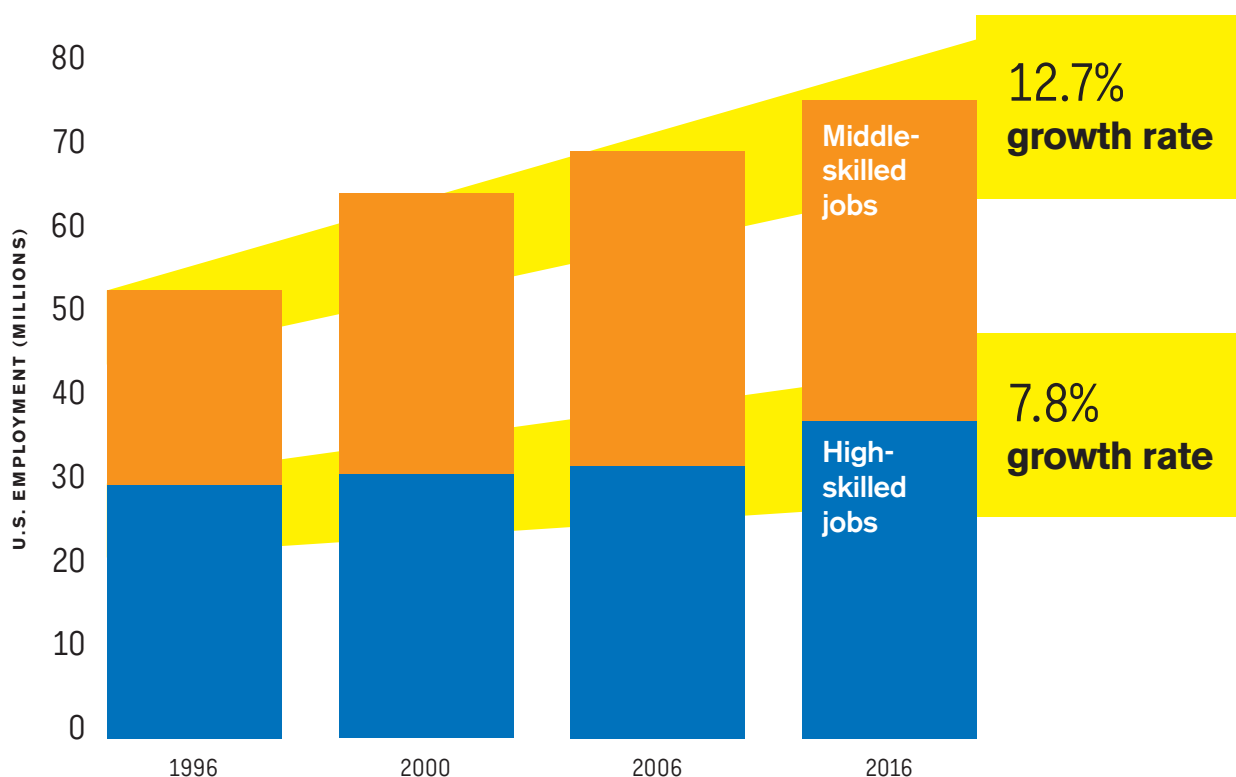
Untapped Opportunities

The U.S. Bureau of Labor Statistics estimates that between 40 percent and 45 percent of all job openings in the economy through 2014 will be in middle-skilled occupations, compared to one-third in high-skilled occupations and 22 percent in low-skilled service occupations.¹¹ As professor Harry Holzer of the Georgetown University Public Policy Institute observes, many of these jobs do not offshore easily and pay relatively well. And a number of these occupations face critical shortfalls in skilled workers.¹²

Two trends affect this job category significantly. Retiring baby boomers will create large vacancies in the low- to middle-skilled jobs. And immigrants are likely to fill the bottom- and top-skilled jobs more easily than those in the middle. Together, these trends will leave growing shortages of workers for middle-skilled jobs—those that require postsecondary education and training, but not necessarily a bachelor's degree.¹³

4. The Growth in Middle-Skilled Jobs Creates New Workforce Opportunities

Source: United States Bureau of Labor Statistics, Employment Projections



Short-term Shortages of Middle Skills

More than 80 percent of corporate respondents in the United States to a Deloitte survey commissioned by the National Association of Manufacturers indicate they are experiencing shortages of qualified workers overall—and more than 90 percent indicate moderate to severe shortages of skilled production employees, including machinists, craft workers and technicians.¹⁴

A 2007 survey of U.S. employers by Manpower Inc. indicates that technicians, mechanics and machine operators remain among the 10 top critical talent shortages.¹⁵

- | | |
|--------------------------|--------------------------|
| 1. Sales Representatives | 6. Truck Drivers—Freight |
| 2. Teachers | 7. Drivers—Delivery |
| 3. Mechanics | 8. Accountants |
| 4. Technicians | 9. Laborers |
| 5. Management | 10. Machine Operators |

Musings of a Maintenance Evangelist

Joel Leonard

Founder
Skill TV



"No one wants to work in the boiler rooms,
No one wants to work with the tools.
The nation's youth are taking the easy way out,
There's no one left to fix our schools.
Maintenance technicians are `bout to retire,
Company executives got no one to hire,
How safe does it make you feel?
How safe does it make you feel?"
"The Maintenance Crisis Song" by Joel Leonard

Many experts, including myself, believe that America is in the midst of a major maintenance crisis caused by: 1) the millions of retiring skilled maintenance technicians and maintenance professionals; 2) lack of interest by future generations; 3) companies that are installing increasingly complex, new equipment with no or minimal budget allocated for additional training; and 4) old equipment that continues to age and requires more maintenance. A perfect maintenance storm is brewing—and is forming largely under the radar screen.

The basic question that every company should be asking is: "What is the product of the maintenance department?" The typical answer will be reactive—to repair broken equipment. But the real product of the maintenance department is not repair; it is capacity. Even as companies are substituting technology for labor in machine operations, they need more maintenance workers for the machines themselves. The highly sophisticated automated systems require even more care and attention to keep the plant running at optimal levels.

When people think of this field, they see Bubba and Skeeter. But the maintenance stereotype of grease monkeys is way off the mark. Companies now need technicians not just for mechanical systems, but also for electrical and electronic control systems as well as sophisticated predictive maintenance technologies like vibration analysis, ultrasonic leak detection and infrared thermography.

Business and government leaders need to remember that as they strive to fund bleeding-edge ideas to get cutting-edge results and competitive advantages in a global marketplace, they also must polish the rusty edge of business. We cannot neglect the proper maintenance of the hydraulic, electronic and electrical systems that sustain us today as we strive to develop biotech and nanotech solutions for tomorrow. If we can become the "Reliability Nation" by building a strong foundation of skilled technicians, uptime performance and rapid recovery strategies, our economy will grow and more high-paying jobs will be created and captured in the United States.

Looming Shortfalls

Demand for these types of skills will only grow during the next decade with the retirements of current workers. For example:

Maintenance Workers

For every 10 workers who retire, there are only three to seven to replace them, creating a shortage of skilled men and women who are trained to keep complex machines operating.¹⁶

Auto Mechanics

The Bureau of Labor Statistics forecasts that auto repair shops nationwide face an annual shortage of about 35,000 auto technicians through 2010.¹⁷

Welders

According to the American Welding Society and other industry research, average welders are in their mid-fifties, with many approaching 60 years old. Estimates suggest that more than half of the industry's highly trained workforce is nearing retirement, creating a potential shortage of more than 200,000 skilled welders by 2010.¹⁸

Electric Power Workforce

The average age of the power workforce is nearing 50—half of the country's 412,000 power workers are expected to retire in the next 10 years. A 2004 Edison Electric Institute survey shows that approximately 20 percent of the electric transmission workforce is expected to retire in the next five years.¹⁹

The society that scorns excellence in plumbing because plumbing is a humble activity, and tolerates shoddiness in philosophy because philosophy is an exalted activity, will have neither good plumbing nor good philosophy. Neither its pipes nor its theories will hold water.

John Gardner, former Health, Education and Welfare Secretary

The importance of these technology workers to the economy is growing in lock step with the sophistication—and fragility—of today's technology-based civilization. Increasingly, these jobs demand a capability to work with complex tools and systems. Technology workers need to be astute and anticipatory—able to spot problems and prevent potential failures. They need to be experienced and empowered, able to leverage their knowledge to propose improvements and even innovations. They keep the technical infrastructure of the nation humming.

Bottom Line

Many of these jobs pay well, often well above the national average.²⁰ The time has come to stop thinking of them as blue collar, and start thinking of the people as technology workers. These positions create solid career opportunities for millions of Americans. Community colleges must become an integral partner in expanding the technology workforce. And the nation must put a high priority on ensuring public-private partnerships to fund adequate training programs for what are likely to emerge as critical shortages.

5. Many Middle-Skilled Jobs Pay As Well As Jobs Requiring a Bachelor's Degree

Source: United States Bureau of Labor Statistics, Employment Projections, 2006-16

Jobs Requiring Training, a Vocational Award or an Associate Degree	Jobs Requiring a Bachelor's Degree	2006 Median Annual Wage
Air Traffic Controllers General Operations Managers	Airline Pilots & Copilots Nuclear & Chemical Engineers Computer Software Engineers	\$70,000+
Nuclear Power Reactor Operators Police & Detectives Supervisors Radiation Therapists Nuclear Technicians Elevator Installers & Repairers Dental Hygienists	Environmental Engineers Civil Engineers Financial Analysts Personal Financial Advisors Architects (excl. landscape & naval) Logisticians	\$60,000
Detectives & Criminal Investigators Registered Nurses Locomotive Engineers & Operators Flight Attendants Aerospace Technicians Telecom. Equipment Installers & Repairers	Orthotists & Prosthetists Landscape Architects Conservation Scientists Accountants & Auditors Food Scientists & Technologists Multi-media Artists & Animators	\$50,000
Services Sales Representatives Fire Fighters, Inspectors & Investigators Police & Sheriff's Patrol Officers Aircraft Mechanics & Service Technicians Construction & Building Inspectors Electricians & Plumbers Industrial Machinery Mechanics	Surveyors Secondary School Teachers Editors Elementary & Middle School Teachers Forensic Science Technicians Kindergarten Teachers Probation Officers	\$40,000

Note: 1) Not all occupations within a wage range are listed; 2) Only occupations projected to experience growth between 2006 and 2016 are shown; 3) "Jobs Requiring... or an Associate Degree" include only those whose most significant source of education and training comes from moderate or long-term on-the-job training, work experience in a related occupation, a postsecondary vocational award or an associate degree; and 4) Occupations listed under "Jobs Requiring a Bachelor's Degree" do not require education beyond a bachelor's degree.

The Changing Landscape of Education

Judith F. Cardenas

President

Lansing Community College



Workforce development, a key role of the comprehensive community college, is about more than just providing training for existing jobs. It is about building capacity for new jobs, about developing an educated and entrepreneurial population, and about creating ladders for learners to access learning throughout their entire lives. It is tied tightly to the community college/four-year transfer function, community responsiveness and developmental coursework roles of colleges. These functions bundled together create a strong response to community needs.

Workforce and economic development activities are fueled both by those who are creating work and by those who need work. This urgency reminds me of an African proverb from Thomas Friedman's book about the changing nature of work, found in an American auto parts company in China:

*Every morning in Africa, a gazelle wakes up.
It knows it must run faster than the fastest lion or it will be killed.
Every morning a lion wakes up.
It knows it must outrun the slowest gazelle or it will starve to death.
It doesn't matter whether you are a lion or a gazelle.
When the sun comes up you better start running.*

As leaders in today's higher education system, community colleges must be aware that the importance of working with their communities to prepare for the race is more critical than ever. However, our definition of community has drastically changed. We are no longer able to define community as merely our local and immediate community. Our global and competitive world has now become our new community.

Leaders throughout our nation are rethinking their position related to globalization within the construct of our academic systems. Creating programs which foster entrepreneurship, agility, cultural sensitivity and productivity will be required in order for the U.S. to stay competitive and ahead in our changing world.

Through the creation of strategic partnerships, private/public collaborations and integration of best practice models from corporate America, colleges can begin to transform themselves into highly credible, accountable and competitive centers of excellence. Colleges must look for new ways of forging partnerships and redefining their mission.

Our educational landscape is changing, and our world is changing. We must wake up every morning and run together as fast as we can.

Service Economy Skills

People sometimes have a misconception that most service jobs are low-skilled, low-wage, no-benefits jobs in fast food joints and beauty parlors.

But it is time for a reality check. During the period that America was making a transition to a service economy, the GDP more than doubled from \$6 trillion in 1991 to nearly \$14 trillion today, and the economy accommodated millions of new college graduates.²¹

Service Economy: Engine of Economic and Job Growth

The service economy is an engine of wealth creation. It now accounts for the lion's share of U.S. jobs and gross domestic product.²²

The stereotype of low-skilled service jobs actually represents only a small percentage—just 22 percent—of the large and growing service employment in the United States. More than 30 percent of

service jobs are in the highest skill category of professional, technical, managerial and administrative occupations which tend to be knowledge-intensive, using the latest collaboration and communications technologies.²³

Services account for 75 percent of all jobs in the United States today. And virtually all of the projected employment growth in the U.S. economy until 2016, according to the Bureau of Labor Statistics, will occur in service-providing industries. Professional and business services, as well as health care services, are the areas of largest expected growth.

Who are these service workers? They are doctors and lawyers, architects and accountants, CEOs and scientists, branding and marketing specialists, software engineers and computer programmers, office workers and educators, transportation and logistics providers, health and human services workers, plumbers and electricians.

Hooked on (and into) Services

James C. Spohrer

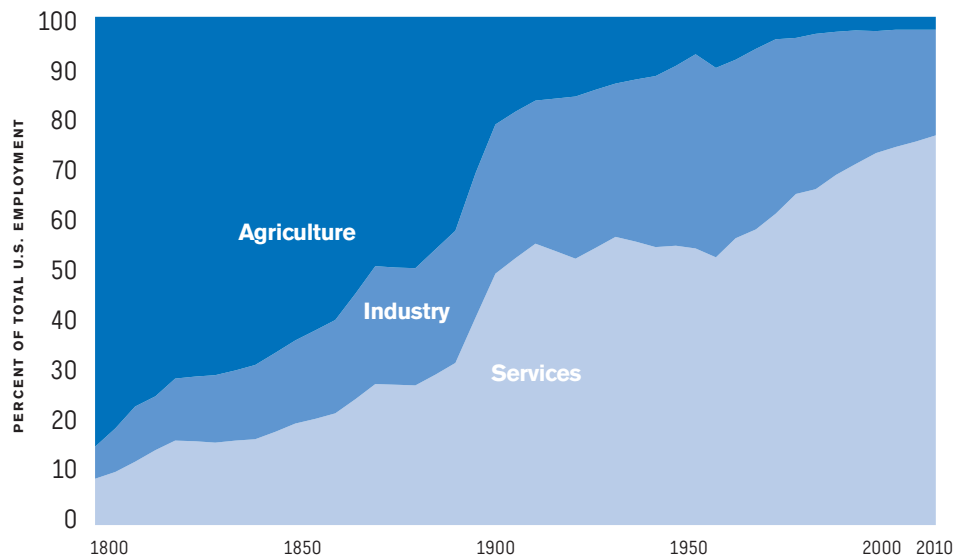
Director of Service Research
IBM



We hear a lot about the service economy, but what is it really? To understand the nature of the service economy, get a piece of paper and start making a list of all the times you're in the role of a customer during the course of a day. Start from the moment you turn on the lights in the morning (electric utility services), commute to work (transportation services), boot up your computer (information services), grab a sandwich at your desk (retail food services), check your bank balance (financial services), or put your feet up and watch TV (entertainment services). We are all in the role of customers of service systems about 40 times a day. Maintaining the infrastructure and supply chains that deliver these and many new types of services creates local jobs near you. As customers' expectations of quality service rise, so do the number of knowledge-intensive service engineering and management jobs, as well as service sales and delivery jobs.

6. Services Power U.S. Job Growth

Source: IBM Study, 2004



These are the workers who will drive America's economic growth today and in the future.²⁴ The service economy accounts for a large and growing share of America's economic pie.

	Contribution to GDP	Share of GDP Growth
Private Services Producing Sectors ²⁵	83.3%	67.8%
Private Goods Producing Sectors	15.2%	19.8%

Services Drive Demand for Higher Skills

According to Professor Anthony Carnevale of Georgetown University, from the Civil War until the 1970s, the United States was the world's most successful mass-production economy; the very best at producing standardized goods and services at the least cost and selling them at the lowest price. These mass-production successes required rigorous discipline and narrow skill. As the world got richer, the competition shifted rapidly to new kinds of added value that required new kinds of skill. More of the value-added of manufacturing began to come from the services associated with production: marketing; financing; customer service and managing quality;

variety; customization; innovation; convenience; novelty; and speeded operations.²⁶

This approach to the service economy embraces, and does not exclude, manufacturing. To a large extent, the demarcation line between services and manufacturing is a relic of an outmoded data collection system. The most competitive companies today bundle products and services—and with good reason. With the rapid pace of technology diffusion, even advanced products can be commoditized. Integrating services into the mix changes the value hierarchy and transforms the revenue stream.

In the wireless industry, the profits come from voice and data services, and not from the sale of phones and devices. Jet engine manufacturers do not just sell engines and spare parts, but also propulsion services that continue to generate revenues through the product's lifespan—five times more revenues than the original sales price. Manufacturing companies are transforming themselves from product suppliers into solutions providers and competing on customer satisfaction and innovation. What they need are workers with the skills to meet these new demands.

That growth in value-added services is driving demand for higher-skilled and more educated workers. In 1973, only 28 percent of prime-age workers had any post-secondary education. Today, 59 percent attended some type of post-secondary institution.²⁷

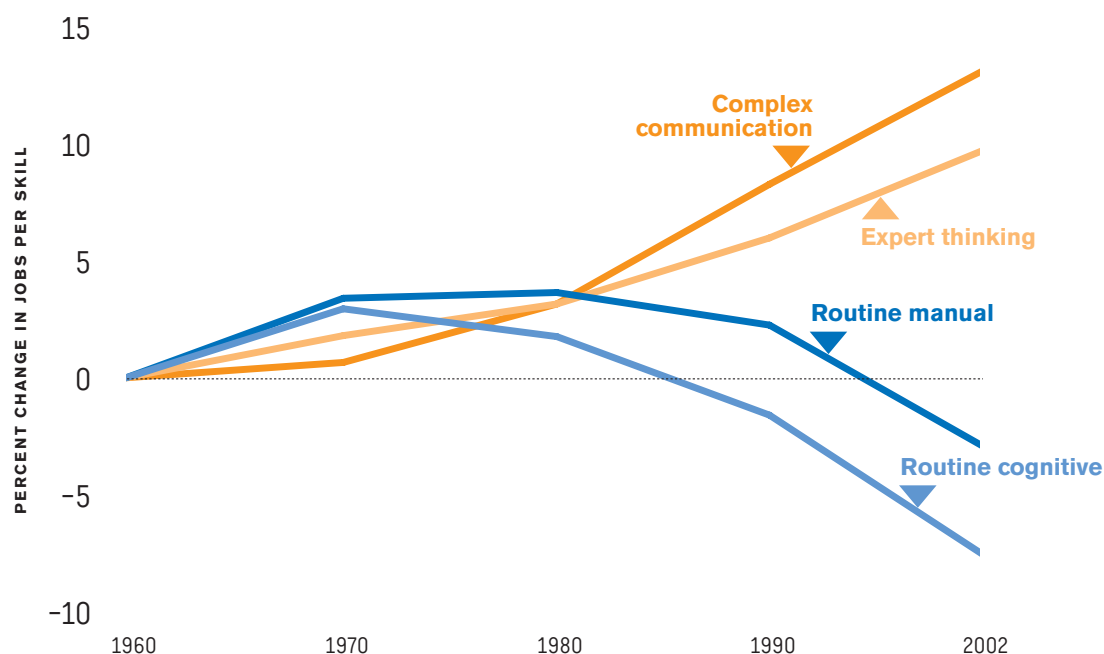
The service economy is creating a need for new and more complex skill sets—creativity, problem solving, communications, customer relations, computing, collaboration and teamwork. Increasingly, all workers have to be adaptive and flexible—able to respond rapidly and with independent initiative. These post-industrial jobs in legal, finance, business consulting, health care, education and other knowledge-intensive service industries require higher levels of communications and problem-solving skills because their work entails higher levels of human interaction and customized, often personalized, responses to challenges and opportunities.²⁸ Americans live and work in a service economy, yet are only just beginning to teach and train students and workers to improve service sector productivity and innovation.

Bottom Line

The time has passed to abandon the misguided stereotypes and focus on skills for the knowledge-intensive service economy. In virtually all advanced economies and successful emerging ones as well, new services are becoming the dominant driver of economic growth and are making it easier for entrepreneurs to innovate new business concepts. Competing for the future means it is time to get serious about figuring out how to create a skills advantage for American workers and companies. Understanding the best practices and skill sets in a more rigorous way is the key. Industry, academia and governments have begun to support multidisciplinary curricula, training programs and research agendas around service science—but much more needs to be done.

7. The Service Economy Generates High Demand for Higher Order Skills

Source: Council on Competitiveness, *Competitiveness Index*



Education and Market Advantage

James L. Oblinger

Chancellor

North Carolina State University



For many people, “globalization” conjures up images of worldwide competition for jobs, resources and markets. It holds out the promise of a more equitable, interconnected world and the challenge of preserving our position of economic, political and cultural leadership. It is only when we start to tease apart what globalization is that we start to get a better understanding of what it means for colleges and universities.

Former Secretary of Labor Robert Reich recently said: “Underlying all the debates over globalization, and all the debates over trade and direct investment is this most important singular fact...if you are well educated...if you are well able to innovate, you are advantaged in the global economy. You have a larger and larger market for your intellectual capital.”

Simply put, education and innovation are intrinsically linked. In a world connected primarily and increasingly by its problems, the successful global workforce is one that excels at problem solving—and solving today’s complex, global problems requires innovation.

Developing a globally attuned, innovative workforce involves widening the scope of educational experiences for our students beyond our borders, giving them opportunities to confront and solve real-world problems and bring together other disciplines, insights and approaches in novel ways. Such opportunities are not limited to study abroad programs. Corporate, government and university partnerships can catalyze innovation and provide students with a unique perspective.

Interdisciplinary education, research and collaboration help students expand their world view, as does creating opportunities for students to be entrepreneurial and work with practicing professionals. Corporate and government partners can model problem solving, mentor aspiring students, and challenge them with real-world, complex problems. But those same corporate partners benefit from the energy, enthusiasm and innovation our students bring.

On Centennial Campus at North Carolina State University, we have evolved the corporate partnership concept, literally moving corporate and government partners closer to students and faculty. Global organizations physically become part of campus, providing an opportunity for students to see and understand not just the problem or the solution, but the process of innovation and problem solving. Having this unique, tangible connection provides additional relevance to students’ education. And corporations come to campus not just looking for a place to locate but with a mindset that includes student engagement, workforce development and innovation.

MeadWestvaco, a global packaging firm, recently engaged students to help the company improve “at the front-end of innovation.” GlaxoSmithKline wanted interns with a background in computer programming, mathematics and facility with logic and cognitive science—students they found in the philosophy department—to help them turn ideas into action. Not only did the students gain valuable experience, the corporations gained as well. Innovation is not limited by age or position—it is catalyzed by diversity of perspective, a willingness to collaborate and a problem to be solved.

A critical part of education is helping students understand and experience problem solving and innovation. Those who learn to innovate will prosper in a global economy. As we think about the education our universities provide, we should not forget the education our corporate and government partners can share.

The Innovation Advantage

In this new global economy, America faces highly effective competition not just for low-skilled, low-wage jobs, but also for lower-wage, highly-skilled ones as well. Other countries are building innovation ecosystems that have been successful in generating new knowledge and patents, producing technical talent in large quantities, attracting higher-value investment, and building local industrial capacity in cutting-edge technologies and services. There is no question that the capabilities of innovator nations are getting better—in some cases, much better.

Consider that:

- R&D employment by American multinationals overseas is growing—about 76 percent during the last 10 years—while the growth in R&D employment by foreign multinationals in the United States peaked in 1999 and has been declining.
- The U.S. share of the world's scientists and engineers is projected to fall from 40 percent in 1975 to 15 percent in 2010.²⁹

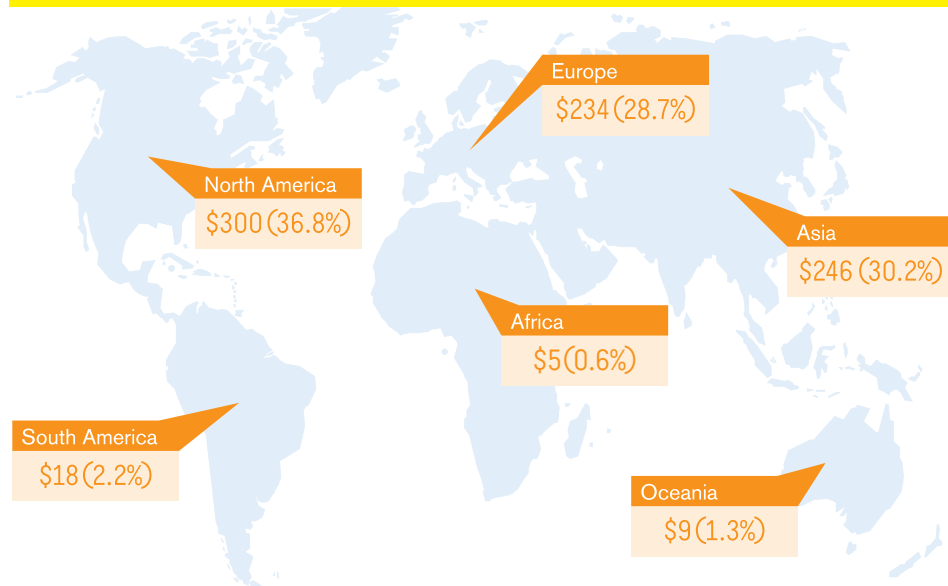
- America's share of global foreign direct investment (FDI) inflows has declined from its peak of 21 percent in 2000 to 11 percent in 2005, although FDI inflows to the United States have recently been on the rise.
- In 2000, the United States accounted for 20 percent of the world's high technology exports while China accounted for only 4 percent. As recent as 2005, however, the U.S. share of global high-tech exports dropped to 15 percent while China's share increased to more than 14 percent.³⁰

In recognition of this changing competitive landscape, Congress passed the America COMPETES Act in 2007, which sought to restore technological leadership with significantly increased funding for frontier research, math and science education, and incentives to graduate more scientists and engineers. The critical issue going forward is to ensure adequate funding for these programs. Sustaining America's competitive edge requires both commitment and action.

8. The United States Faces Competition in Research and Development Investment

Source: National Science Foundation, *Science and Engineering Indicators 2008*, p. 4-36, Figure 4-14.

World Total R&D Investment, 2002 = \$813 Billion



But America needs to ask: *Is just doing more of the same going to be enough in the 21st century?* The U.S. margin of leadership may depend not just on doing more, but on a strategy for doing things differently. If the competition has successfully imitated the American innovation model, then we should be thinking about the new model that will differentiate U.S. capabilities from the rest of the world.

America must be as innovative in talent as it is in technology. Certainly, it will be critical to lead in the fields that are reshaping the global competitiveness landscape—for example, nanotechnology, biotechnology and information technologies. But America must also build on core talents and combinations of skills that differentiate and create a margin of advantage at the innovation frontier, including:

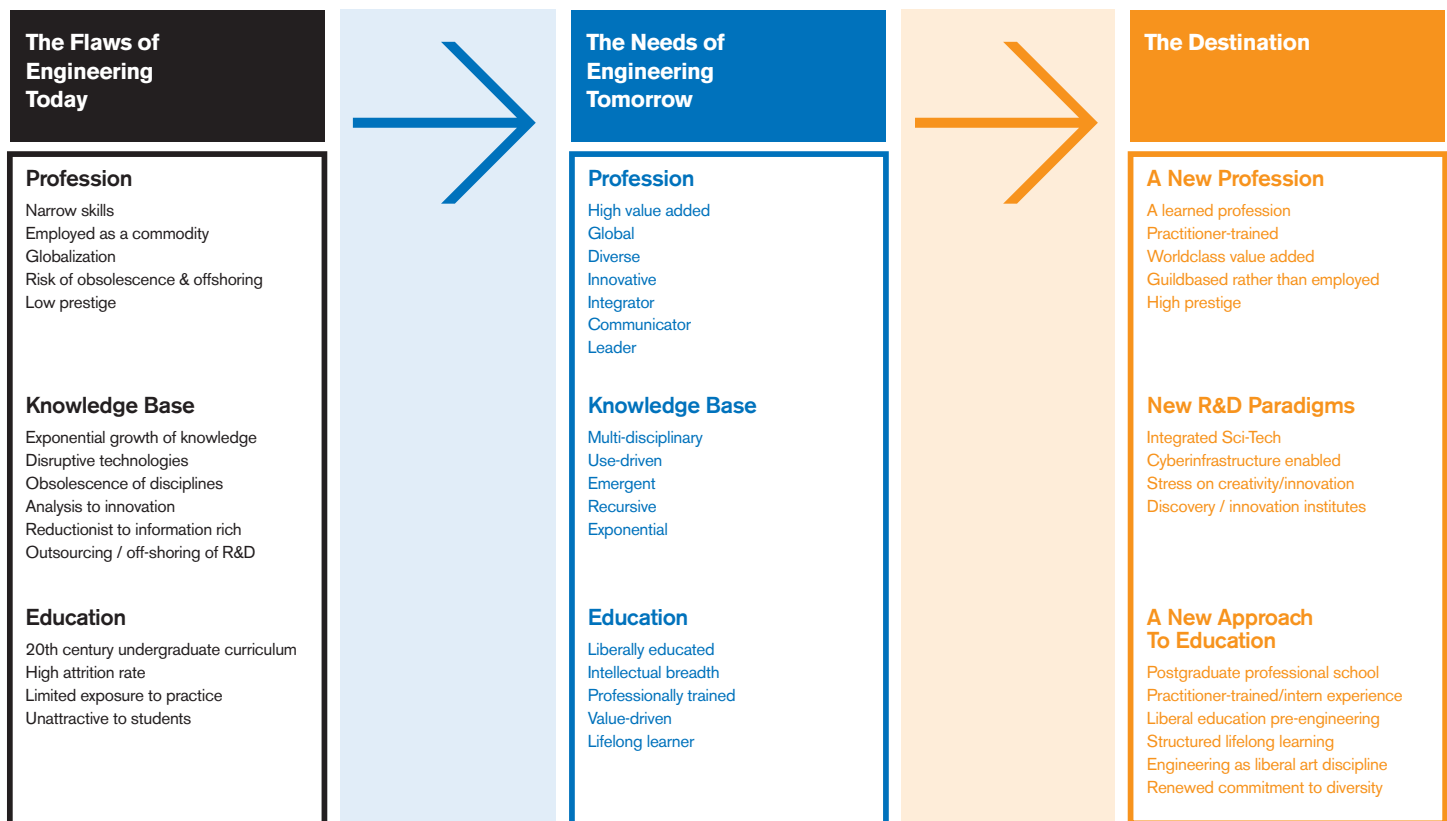
- Educating Renaissance Scientists and Engineers
- Creating a Cadre of Service Scientists
- Leveraging Leadership in Computational Technologies

Educating Renaissance Scientists and Engineers

Science and engineering have become part of global enterprise, and for the first time, American scientists and engineers are competing head-to-head with their counterparts in other countries.

9. Roadmap To 21st Century Engineering

Source: James J. Duderstadt, *Engineering for a Changing World*, Millennium Project, University of Michigan.



In *Engineering for a Changing World*, Compete 2.0 advisor James J. Duderstadt notes that:

America does not need just more engineers, it needs a new kind of engineer. To compete with talented engineers in other nations, in far greater numbers and with far lower wage structures, American engineers must be able to add significantly more value than their counterparts abroad through their greater intellectual span, their capacity to innovate, their entrepreneurial zeal and their ability to address the grand challenges facing our world.³¹

When faced with robust competition from scientists and engineers from around the world, American scientists and engineers must augment their credentials with other capabilities to sustain a leadership position. Today's science and engineering students need to have a robust knowledge not only of disciplines, but of other combinations of skills as well—effective communications, entrepreneurial initiative, creativity and inventiveness.

To sustain America's margin of leadership, 21st century scientists and engineers need to be innovators with an understanding of business value and an ability to work in multi-cultural environments. They need leadership skills with a flexibility to adapt to changing conditions and a willingness to engage in lifelong learning. This requires a commitment by America's leading educational institutions to a different curriculum in both the sciences and engineering than we have today.

Creating a Cadre of Service Scientists

Although the knowledge-intensive service economy is a principle driver of economic growth, there is a dearth of research, funding, and educational curriculum to accelerate America's capacity for service innovation and productivity.

A recent essay, "The Service Imperative," notes that:

Even today relatively few firms have formalized services R&D practices. When *Business Week* annually reports the list of the World's Most Innovative Companies, few service companies

appear on that list. A major academic review article on product innovation reveals little explicit attention to service innovation in the academic literature. According to a 2005 report by the Organisation for Economic Co-operation and Development: "The sector has traditionally been seen as less innovative than manufacturing and as playing only a supportive role in the innovation system."³²

Yet, the ability to drive innovation in services is going to be increasingly important to economic competitiveness.

Services are in the early stages of "industrialization." The industrial age was enabled by three factors: cheap energy; transportation networks; and standardized parts that enabled mass production. The infrastructure for services is evolving along roughly comparable paths. Computing is the analogue for cheap energy that powers the service industry. The Internet and worldwide communications networks provide a global infrastructure backbone. And standardization is already becoming available in some sectors. In the travel sector, for example, Web sites such as Travelocity or Expedia.com customize travel packages assembled from discrete providers.³³

The challenge is that the assembly of complex service systems still remains a trial and error process rather than a predictable discipline. Proponents of a new discipline of service science seek to create a more systematic understanding of how to drive

Choose to Compete

Charles M. Vest

President

National Academy of Engineering



Look back about 25 years and think about what was not going on. There was no World Wide Web. Cell phones and wireless communication were in the embryonic stage. The big challenge was the inability of the American manufacturing sector to compete in world markets; Japan was about to bury us economically. The human genome had not been sequenced. There were no carbon nanotubes. Buckminster Fullerenes had been around for about five years. We hadn't even begun to inflate the dot-com bubble, let alone watch it burst. And terrorism was something that happened in other parts of the world.

Some of the grandest accomplishments in human history were engineered in the century just passed. The widespread development and distribution of electricity and clean water, automobiles and airplanes, radio and television, spacecraft and lasers, antibiotics and medical imaging, and computers and the Internet are just some of the changes that transformed virtually every aspect of human life.

The century ahead poses even more formidable challenges. As the population grows and its needs and desires expand, the problem of sustaining civilization's continuing advancement, while still improving the quality of life, looms more immediate. Old and new threats to personal and public health demand more effective and more readily available treatments. Vulnerabilities to pandemic diseases, terrorist violence and natural disasters require serious searches for new methods of protection and prevention. Breakthroughs in energy security and sustainability—whether a revolution in solar cells or sequestering carbon generated by burning fossil fuels or nuclear fusion—would be game-changing in important ways.

The world is changing remarkably fast, and leadership in science and engineering will drive it. Where will this leadership come from? China? India? The United States? That choice is ours to make. Choosing to compete means that United States must lead in brainpower, organization and innovation.

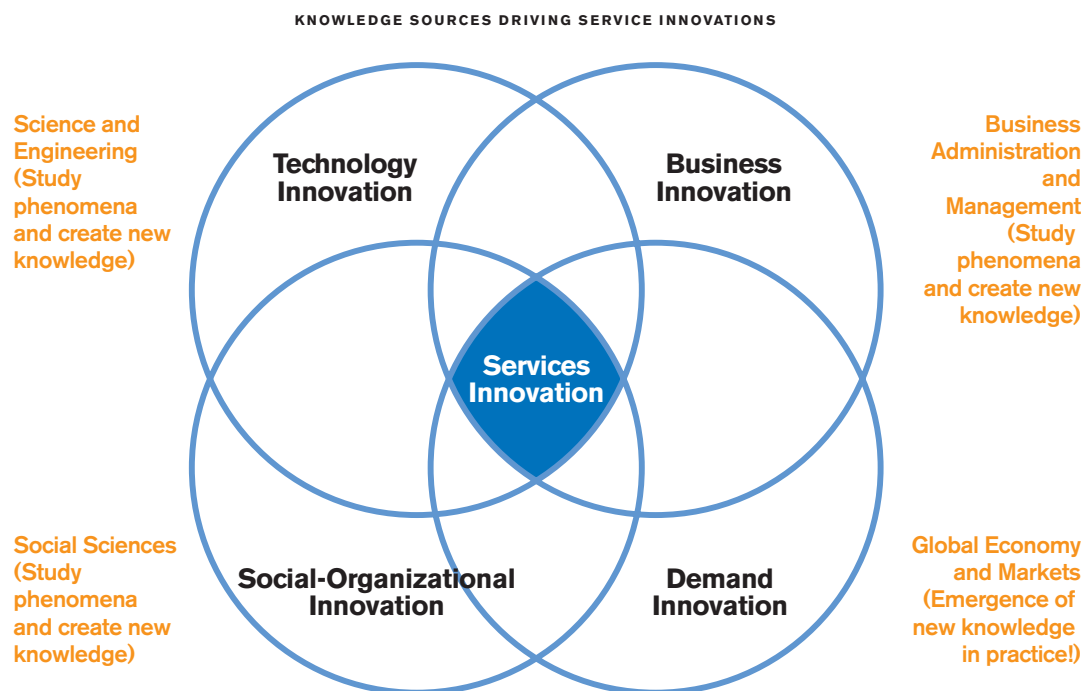
improvements in productivity, quality, compliance, sustainability and innovation in the service economy and to create a cadre of workers to implement that knowledge. Many of today's science and engineering graduates will work in the service economy. They need the knowledge and tools to compete successfully.³⁴

10. The Growing Service Sector Requires a New Combination of Capabilities

Source: IBM Research, 2005

Why Service Science?

New Knowledge Drives the Process of Systematic Innovation...



Some of the questions this new discipline would address:

- How to accelerate the rate of innovation in services, business processes and business models by understanding and filling the existing knowledge and tool gaps?
- How to make innovation and creativity inside the company—intrapreneurship—as relevant to national competitiveness and growth as entrepreneurship?³⁵
- How to anticipate customers' demands and understand their real needs? Henry Ford once said: "If I had asked my customers what they wanted, they'd have said a faster horse."³⁶
- How to create an organization in which collective learning becomes a practice, not just a process?³⁷
- How to design metrics for effectiveness, not just efficiency?³⁸
- How to understand the fundamentals of service sector productivity and develop models to accelerate productivity growth?

The principles of service science remain nascent. But the country that masters this discipline—and produces a cadre of service scientists and engineers who are able to accelerate innovation and productivity in service industries—has a clear advantage in attracting high-value service investments and creating high-value service jobs. The Japanese were the first to master product quality, but so far, no nation has mastered service science, management and engineering.

Leverage Leadership in Computational Technologies

Ongoing research at the Council on Competitiveness is demonstrating that, in the 21st century, “to outcompute is to outcompete.” America clearly has the technological edge. The most powerful computing systems in the world are in the United States, but America lacks sufficient numbers of computational scientists to exploit its leadership position. According to Council surveys, the biggest single constraint on the deployment of advanced computation tools is the lack of computational scientists.

At the frontiers of science and engineering, advanced computation has become a major element of the third leg of discovery tools—the other two legs being theory and experimentation. Computer modeling and simulation dramatically accelerate the pace of innovation—and enable new-to-the-world knowledge and insights.

But the business benefits of advanced computing are also becoming clear to the minority of companies that are able to use it. Leading companies are proving out the advantages of leveraging computational capabilities: accelerating design and engineering of new products; reducing time to market through virtual prototyping; and increasing supply chain efficiency and flexibility.

Consider that:

- In 1980, Boeing tested 77 wings in wind tunnels for the 767. Thanks primarily to high performance

computing (HPC) simulation, Boeing needed to physically test only 11 wings for the 787 Dreamliner series, dramatically cutting costs and design time.

- Entertainment leader DreamWorks Animation SKG would not even exist without powerful computer graphics technology. Every movie is generated on a HPC system.
- At The Proctor & Gamble Company, computational analysis is used for everything from increasing absorbency in Pampers® diapers to designing the right geometric shape for Pringles® potato chips—one that allows the chip to drop gently into a container rather than flying off the conveyor belt.³⁹
- Wal-Mart optimizes its entire supply chain on computer models, including daily data analysis to determine what to stock in every store worldwide.⁴⁰
- On any given day at the NASDAQ Exchange, more than two billion transactions are processed at rates of more than 200,000 transactions per second. The secret sauce is the ability to use computer modeling to increase volume and transaction speed reliably.⁴¹

America's innovation advantage rests not just on having the most advanced tools and technologies in the world, but the people to use them.

Bottom Line

The world is being rewritten in digital, atomic and genetic codes. Information technologies, nanotechnologies and biotechnologies all hold out the promise that new ideas, inventions and innovations will ultimately create whole new industries, not yet conceived. America's innovation advantage means continuous innovation in scientific talent as well as technology and creating the competitive difference that will concentrate cutting-edge investments in this country.

Skills For Sustainability

Looking ahead, skills for sustainability could become a key competitive differentiator. As Joseph Stanislaw has noted: “We are at the very beginning of a global race to create dominant green economies.”⁴²

Global warming and competition for resources could very well change the ground rules of globalization—at the very least, the need to reduce carbon footprints and achieve higher resource productivity could alter corporate calculations about where and how to distribute operations and assets globally. This trend may have already begun among the leading companies. Consider that The Proctor & Gamble Company is putting its first domestic green field manufacturing plant in the United States in more than three decades to be proximate to West Coast consumers.

America could get out in front of this paradigm shift. But it is not clear that the United States will have enough talent with the right set of skills, or has even defined the path forward on skills for sustainability.

America’s Scarcest Sustainable Resource? An Energy Workforce

Ironically, many of the “green skills” that have received the most attention are not actually new skills, but relabeled ones. Nowhere is this more evident than in the energy industries. The lack of energy workers actually constitutes one of the greatest barriers to more sustainable energy, according to a recent Council report, *Define: The Energy-Competitiveness Relationship*.

Consider that:

- The average age for energy workers is 50, nearly a full decade older than the average age of all U.S. workers.
- At least half of the country’s utility workers are expected to retire in the next 10 years.⁴³
- More than half the oil and gas workforce is expected to retire in the next 10 years at all skill levels, from equipment operators and truck drivers, to scientists and engineers. Enrollment in undergraduate engineering programs fell by 79 percent between 1982 and 2004.⁴⁴
- A 2005 study by the Nuclear Energy Institute found that half of the industry’s employees were more than 47 years old, while less than 8 percent of employees were younger than 32. The survey found that more than a quarter of nuclear workers were already eligible to stop working. The number of nuclear engineering majors at colleges around the country has risen to 1,800 last year from just 500 in 1998, according to the Energy Department, but that is still not enough to feed current needs.⁴⁵

In many of these areas, new skills are not required, just adequate numbers of workers who have them. For example, the skills needed to operate a turbine do not depend on whether wind or petroleum turns the blade. Boiler maintenance does not change because solar power heats the water. And the need to have an efficient and effective electric power grid does not change by what generates the electrons. Sustainable energy requires, first and foremost, a workforce capable of supplying America’s basic energy needs.

Skills for Sustainability: Training for the U.S.'s Workforce

David F. Carney

Chairman and CEO

Lincoln Educational Services Corporation

The common perception in America today is that you need a college education to obtain a rewarding career. Consequently, parents and high school counselors are increasingly pushing students to attend college even when they know that college is not the right choice for many young people. As a result, tens of thousands of students every year drop out or graduate without skills to obtain a job.

This focus on college has created a shortage of skilled workers across the United States in many careers from nurses to automotive technicians and welders. For example the American Welding Society predicts that by 2010 the demand for welders will exceed supply by approximately 200,000 workers. Entry level welders with some skills can earn up to \$30,000 while more advanced welders with experience can earn \$60,000 to \$100,000. Here is a job that is in demand and pays well. However, if current trends continue, the U.S. will be importing welders in order to meet demand.

For Lincoln Educational Services, the key to sustainability and competitiveness is a skilled workforce. Since our founding in 1946, Lincoln has been committed to providing students with quality, hands-on skills training needed to succeed in an ever-changing employment landscape. We are proud to be providing enterprising men and women the ability to become mechanics, electricians, HVAC repair technicians, welders, and practical nurses amongst other professions. We understand that many people prefer to work with their hands and to learn in an environment that incorporates industry experience with hands-on training.

Additionally we understand that workers need to upgrade their skills without leaving their jobs, and that is why we have developed online degree programs. Specifically we see a need for online management programs that will enable workers who have started at the bottom of the company ladder to acquire skills that will enable them to move into management positions. These online degree programs enable working adults to better manage the pressures of job, family and education.

Today we need to ensure that America has enough people with the skills to create, build and maintain a sustainable and growing economy. We need to educate parents, students and society as to the many job opportunities that continue to be available and to support training in these fields.

Educating for Sustainability

In fact, sustainability may demand more profound changes in higher education than it does in skills training. Virtually every profession needs to embed principles of sustainability into its core curriculum. Although some leading institutions are experimenting with new programs, these have yet to become widely available or accepted practice.

MBAs for Sustainability

With new C-suite positions in sustainability, energy and environmental impact springing up across the country—as well as demand for carbon analysts and carbon traders in the financial sectors—business schools will play a key role in educating a new generation of business leaders in sustainability. (At present, there is evidence that the principles are not always integrated across the enterprise. See Note 48.) Yet, the Aspen Institute survey, *Beyond Grey Pinstripes*, demonstrates that although business schools have begun to adopt course modules on the environment, much more needs to be done.

The percentage of schools surveyed that now require a course dedicated to business and society issues has increased dramatically from 34 percent in 2001 (when the survey began) to 63 percent in 2007. And the proportion of schools offering environmental content in one required course has increased in most disciplines—accounting, economics, management, marketing and strategy.⁴⁶

But sustainability practices have been slow to find their way into the mainstream curriculum. Only 35 of the 112 business schools surveyed offer a

concentration or major in these areas. According to Rich Leimsider, director of the Aspen Institute Center for Business Education:⁴⁷

What we are not seeing in most schools is an examination of these issues through the lens of risk management and strategy and the realization that mainstream, for-profit business can be a force for positive social and environmental change.⁴⁸

Sustainable Design and Architecture

William McDonough, Founding Partner of William McDonough + Partners, challenged the current college curriculum in design and architecture, writing in the *Chronicle of Higher Education* in 2004:

Each year American colleges and universities hand out design degrees by the thousands... Have their college educations prepared them to be the designers of the 21st century world?... At a moment in our history when the scientific community has warned of some technologies' negative consequences—global warming, water pollution, the loss of biodiversity and natural resources—designers have a crucial role to play in the creation of a more just, healthful and sustainable world.

Our colleges, by and large, are not preparing design students for that challenge. While design for sustainability is increasingly seen as an important element of both basic and specialized courses, we still have a long way to go. Consider, for example, the 2003 *Metropolis* magazine survey of more than 350 deans, department chairs and professors on the relevance of sustainability to design education. Although 67 percent of the respondents strongly agreed that sustainability is relevant to their design curricula, only 14 percent

said their institutions were developing programs to educate their instructors about sustainable design. When asked how many graduate courses their department offered that included considerations of sustainability, 28 percent said none and 45 percent said they did not know.⁴⁹

McDonough envisions a world in which sustainable design is not limited to simply trying to become more efficient. Rather than teaching architecture students and designers how to reduce the impact of their work to meet environmental standards, colleges and universities, he argues, should create industrial and architectural systems for the 21st century that set wholly new standards that would:⁵⁰

- introduce no hazardous materials into the air, water or soil
- measure prosperity by how much the positive effects of the human footprint are enhanced
- measure progress by how many buildings have no smokestacks or dangerous effluents
- generate more energy than they consume

These principles could be embedded across all disciplines. Green chemistry could encourage the design of products and processes that reduce and even eliminate hazardous substances. Green engineers could apply sustainability principles to industrial processes and products that diminish environmental and human hazards and reduce waste and cost. The accounting profession could play a central role both in providing the needed information for social and environmental reporting and helping to verify its accuracy. Public policy analysts can begin to connect

ecological variables to economic ones. For example, the Brookings Institute recently completed a study that shows that an increase of a few percentage points in the water quality in the Great Lakes could drive billions of dollars in regional economic value.⁵¹ Higher education institutes will play a pivotal role in assuring that Americans can understand and apply innovative new concepts for sustainability in every discipline and profession.

Bottom Line

Sustainability is likely to become a game-changer for citizens, communities, companies and countries in the decades ahead. Costs could dramatically change consumer behavior. Regions may eventually compete for global investments based on their carbon footprint and resource productivity; the more resource efficient regions attracting investment through their ability to manage supply and price volatility. Companies could increasingly factor sustainability concerns into their site and investment decisions, with proximity to customers and shorter supply chains receiving greater weight.

Leadership in global markets may depend on getting out in front of the sustainability shift with a sprint toward creating the right combination of talent, technology and infrastructure to support the green economy.

Last Thoughts

Most Americans understand that globalization is a game-changer. But many are not sure that they are going to like the new game. For better or worse, the modern economy is a global economy, which the United States can influence given the sheer size of its market. But America is no longer the sole economic superpower.

The new global landscape is increasingly shaped by global enterprises and networks that transcend national boundaries, by hundreds of millions of new middle-class consumers that reside outside the United States, and by millions of new, sometimes highly credentialed workers whose average salaries are typically lower than the average American salary. What this enables is a redistribution of assets and operations on a global scale.

The old rules no longer dictate who wins or loses. What is clear is that new strategies for success are needed to create the kind of platform that will ensure that America's next generations enjoy a rising standard of living—in short, to ensure that Americans can compete successfully. That requires that the focus be put on:

- Enabling the supply of middle-skilled jobs to match future demand
- Integrating the more complex skill sets required in service economy jobs into education, training and research programs

- Extending America's innovation leadership with a focus on integrative, interdisciplinary, computational and entrepreneurial skills—and with a new emphasis on supporting innovation in service industries
- Anticipating future skills trajectories at the cutting edge of sustainability

The Goal Posts

To create a skilled workforce, strengthen existing industries, launch new firms and attract high-value investment into the United States, we must act and invest wisely. America needs to prioritize around the kinds of investment that generate high-wage jobs.

Success in the 21st century means looking forward—positively and proactively—at where the country is going, not backward at who is catching up. The rest of the world has been copying the American innovation model—investing in talent, research, education and technology, and building a policy infrastructure that protects IP, opens markets and supports investment. Their success in attracting jobs and investments is, in some measure, due to the fact that they copied a great American roadmap.

Notes

When everyone is copying this model, it is time for America to invent a new one.

Human capital is the nation's strongest asset. In assuring America's prosperity in the future, it is necessary to build from a position of strength—not just economically, but culturally. America truly is the can-do country. From the nation's founding, exploration and experimentation has been part of its DNA. Americans need to get out in front and get out fast to translate that can-do spirit into wealth creation—creating a new roadmap that will:

- Embrace the freedom to test the frontiers of knowledge and technology
- Create the spectrum of skills that keeps a complex infrastructure humming
- Nurture the entrepreneurial spirit that risks a step into the unknown
- Enable the innovation that creates whole new industries, and
- Celebrate an innovation nation.

These Choices Are Ours to Make.

The Future Is Ours to Lose.

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Has your company ever consulted with you on any of the following?

(% respondents)

	Yes	No
How to interpret sustainability in the context of your job	34	66
What changes you could make in your business unit or department to improve its sustainability	49	51
Whether or not you would wish to be involved in any sustainability initiatives	32	58
What aspects of sustainability you feel are most important	31	59
Where sustainability could lead to new products or services	38	62

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The Council's mission is to set an action agenda to drive U.S. competitiveness, productivity and leadership in world markets to raise the standard of living of all Americans.

The Council on Competitiveness is the only group of corporate CEOs, university presidents and labor leaders committed to ensuring the future prosperity of all Americans and enhanced U.S. competitiveness in the global economy through the creation of high-value economic activity in the United States.

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HOW WE OPERATE

The key to U.S. prosperity in a global economy is to develop the most innovative workforce, educational system and businesses that will maintain the United States' position as the global economic leader.

The Council achieves its mission by:

- Identifying and understanding emerging challenges to competitiveness
- Generating new policy ideas and concepts to shape the competitiveness debate
- Forging public and private partnerships to drive consensus
- Galvanizing stakeholders to translate policy into action and change

Compete 2.0: Program Leadership

Deborah L. Wince-Smith is the president of the Council on Competitiveness, a group of CEOs, university presidents and labor leaders committed to driving U.S. competitiveness. She is a Senate-confirmed member of the IRS Oversight Board and a member of the NASDAQ Stock Market Board of Directors. Wince-Smith also serves on the U.S. Secretary of State's Advisory Committee on International Economic Policy, the Board of Governors for the Argonne National Laboratory, and the boards of several private equity startup companies. She has more than 20 years of experience as a senior U.S. government official, including as assistant secretary for technology policy in the Department of Commerce during the George H. W. Bush administration.

Debra van Opstal is the senior vice president of programs and policy at the Council on Competitiveness. She has been a principal author on a number of Council publications, including: *Five for the Future* with Bill Bates; the Council's Enterprise Resilience Initiative 2007 publication, *Transform*; and *Innovate America*, the 2004 report of the National Innovation Initiative. Prior to joining the Council, van Opstal was the fellow in science and technology and deputy director of the S&T program at the Center for Strategic and International Studies in Washington. Van Opstal currently chairs the judging panel for the Gerald R. Ford journalism award.

William Bates is vice president for government affairs at the Council on Competitiveness. He is the co-author of the Council's *Five for the Future* competitiveness agenda. Bates previously served as director of government relations for the United States Telecom Association. Prior to that, he was chief of staff and legislative director to House Commerce Committee member, U.S. Congresswoman Anna Eshoo (D-CA). With more than 14 years experience working for and with government policymakers, Bates brings a unique combination of political and policy expertise to the Council.

Chad Evans is vice president of strategic initiatives for the Council on Competitiveness. He leads the Council's Strategic Initiatives programs, including the National Innovation Initiative, the Global Innovation Initiative, the Technology Leadership Council, and several special projects. In addition to his work on national and global innovation ecosystems, Evans' portfolio during the past decade has centered on benchmarking the competitiveness of developed and emerging economies, including spearheading the Council's flagship publication, *The Competitiveness Index*.

James Knuckles is a research associate with the Council's Strategic Initiatives. His primary areas of focus include conducting research to benchmark U.S. competitiveness for the Council's Compete 2.0 initiatives and to support the Council's global engagements, and assisting with the planning and implementation of many of the Council's outreach events. Prior to joining the Council's staff, Knuckles was an intern with the Council. Before this, he worked for Harley Davidson Financial Services, Inc. on their cash management team.



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